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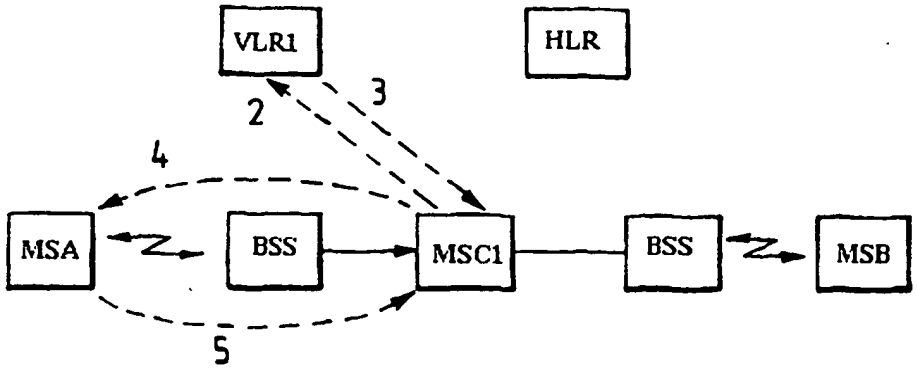

(57) Abstract

The invention relates to a method for indicating the charge of a call in a telecommunications network. According to the invention, the subscriber who will be charged for the call is informed of the charge of the call in advance, before the link to the other subscriber is even established. When a subscriber (MS_A) wishes to set up a call, he performs normal dialling, and the data dialled by the subscriber is transmitted in the normal manner (1) over the radio path to the fixed network (BSS; MSC1). On the basis of the location (2, 3) of the calling and/or called subscriber, the network estimates the total charge, unit charge (Mk/min) or charge level of the call, of which information is sent to the subscriber either in each case or on the basis of certain criteria. If information on the charge of the call is sent (4) to the subscriber, the call set-up will not be continued until the subscriber gives his permission to do so by a specific acknowledgement message (5). At this stage, the radio network and the fixed network do not allocate any resources. If the subscriber rejects the call and does not send an acknowledgement message, the call set-up is terminated. The invention also relates to a subscriber station to be used in the method.

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A method for indicating the charge of a call, and a subscriber station

The invention relates to a method for indicating the charge of a call.

It is a characteristic feature of radio networks that the radio link allows subscribers to roam freely within the area of the entire network and even from one national network to another as, for example, in the new pan-European digital mobile phone system GSM. For instance, a Finnish subscriber may be travelling in England and communicate with the system through the national network of England. If another Finnish subscriber then tries to contact the subscriber who is in England, the call must be routed from Finland to England through the networks of e.g. Sweden and Norway, whereby the charges of all of these networks will be added to the charge of the call. The charge of the call can thus be rather high, which may be a surprise to the subscriber if he is not prepared for it. Therefore a calling subscriber, for example, would usually like to know in advance how much he will be charged for the call; this he would only find out if he knew the location of the called subscriber. However, most subscribers do not want just anybody to be able to find out their location, not even approximately, and therefore the present systems have adopted the principle that the charge to be collected from the calling party is independent of the actual location of the called party. Charges due to the roaming of the called party are collected from the called party. On the other hand, the called party does not know in advance, either, where the calling party is located and thus cannot estimate the charge of the call.

The current cellular networks offer a so-called advice-of-charge service, by means of which the charge of a call can be indicated in real time on the subscriber station. It has become more and more usual to attempt to apply radio technology even to the area of a conventional public switched telephone network, i.e. to replace a so-called fixed cable with a radio link. Before long, the roaming of subscribers will be possible even in a public switched telephone network. The subscribers of a telephone network using fixed links are not necessarily used to this, which will be a problem. The charge of a call or the unit charge may be higher than what the subscriber is prepared for.

An object of the present invention is to give the subscribers better chances to influence the charge of a call in advance.

Another object of the invention is to allow the charge of a call to be more flexibly divided between A- and B-subscribers.

These and other objects and advantages of the invention are achieved with a method which, according to the invention, is characterized in that

a calling subscriber sends to a fixed network a call set-up request comprising the number of a called subscriber,

the fixed network estimates the charge or charge level of the call to be set up in advance on the basis of the location of the calling subscriber and/or the called subscriber,

the fixed network sends information on the estimated charge or charge level of the call to the subscriber who will be charged for the call, at least in the case that the estimated charge or charge level does not fall within the predetermined range of charges allowable to said subscriber,

the charge or charge level of the call is indicated to the subscriber, and an acknowledgement message is sent to the fixed network if the subscriber wishes to continue with the call set-up,

the fixed network continues with the call set-up after having received said acknowledgement message or otherwise permanently terminates the call set-up.

The basic idea of the present invention is that the subscriber who will be charged for a call is informed of the charge of the call in advance, before the link to another subscriber is even established. The advice-of-charge service according to the invention is a subscriber-specific service, which the subscriber may activate either permanently or separately for each call. When a subscriber who has an activated advice-of-charge service wishes to set up a call, he performs normal dialling, and the number dialled by the subscriber is transmitted in the normal manner over the radio path to the fixed network. On the basis of the location of the calling and/or called subscriber, the network estimates the total charge, unit charge (Mk/min) or charge level of the call, of which information is sent to the subscriber either in each case or according to certain criteria. If the information on the charge of the call is sent to the subscriber, the call set-up will not be continued until the subscriber gives his permission to do so by a specific acknowledgement message. At this stage, the radio network and the fixed network do not allocate any resources. If the subscriber rejects the call and does not send an acknowledgement message, the call set-up is terminated.

In the above, the advice-of-charge service was described from the point of view of the A-subscriber. If the charge of a call is collected from the called party, i.e. from the B-subscriber, and the B-subscriber

has to pay for the entire call, i.e. even the charges due to the roaming of the A-subscriber, the B-subscriber may also wish to be provided with the service according to the present invention. In this case, an estimate of the total charge, unit charge or charge level of the call is sent to the B-subscriber before the call is set up, and thus the B-subscriber is given the possibility of not to accept or receive the call if he finds it too expensive.

According to the invention, the estimation of the charge of a call can, in principle, be based on two criteria:

1) real-time information on the charge of a call (e.g. Mk/min), or

2) a rougher distinction between tariff levels, e.g. low/high tariff: low in the home network, high elsewhere.

The first alternative is thus based on knowledge of the exact charge, calculated by time, whereas according to the second alternative, the subscriber is informed only of the tariff level of the call, e.g. low/high. The tariff level is more easy to determine in real time and to give to the user for consideration before the setting up of the call is continued.

According to an embodiment of the invention, a blocking function will be activated in the subscriber data. As a result of this, the fixed network will not continue to set up a call even if it receives an acknowledgement message from the subscriber if the estimated call charge or the charge level is not within the range of charges set for the subscriber by the blocking function. In other words, this is such an advice-of-charge service according to the invention where the termination of call set-up can under no circumstances

be avoided. In the future, there may be, for example, several mobile phones in one family. The parents can then set a blocking function to prevent the children from calling other calls than low-tariff local calls. Likewise, companies can restrict the use of the mobile stations of their employees to a certain service area.

The invention also relates to a subscriber station comprising a display, number keys and function keys. The subscriber station is characterized in that the subscriber station indicates the call charge information received from the telecommunications network on a display, and that a user may activate the subscriber station by said function keys to send an acknowledgement message to the telecommunications network in order to continue the setting up of the call.

In the following, the invention will be described by means of exemplary embodiments and with reference to the accompanying drawings, in which

Figure 1 illustrates schematically a cellular radio system to which the invention may be applied,

Figures 2 and 3 illustrate signalling according to the invention, and

Figure 4 illustrates a mobile station according to the invention.

The present invention may be applied to any trunking or cellular radio system, such as the digital GSM mobile telephone system, NMT (Nordic Mobile Telephone), DCT1800, PCN (Personal Communication System), UMTS (Universal Mobile Telecommunication System), FPLMTS (Future Public Land Mobile Telecommunication System). The invention can also be applied to telecommunication systems which support personal mobility, e.g. to systems offering UPT service (Universal Personal Telecommunications). In the following, the invention will be described by way of example in the GSM mobile phone

system. The basic structure and operations of the GSM mobile phone system are well known to those skilled in the art and defined in the specifications of the GSM system. Reference is also made to *The GSM System for Mobile Communications* by M. Mouly and M-B. Pautet, Palaiseau, France, 1992, ISBN: 2 9507190 0-7.

As is well known, the geographical area covered by a cellular radio network is divided into separate smaller radio areas called cells. When a mobile station MS is located within a cell, it communicates with the network over the radio path through a fixed transceiver station, or base station BS, located in the cell. The mobile stations MS belonging to the system may roam freely within the area of the system from one cell to another. A cellular radio network must, however, have information on the location of a mobile station MS in order to be able to route incoming calls to the MS or page this for some other reason. Typically a cellular radio network knows the location of a MS with an accuracy of a larger area formed by several cells, which is usually called a location area. When a MS roams in the system, it performs location updatings, which cause the subscriber data of the MS to be updated in the subscriber databases of the cellular radio network. For example, in the GSM system, illustrated in Figure 1 the cellular radio network comprises at least a home location register HLR, visitor location registers VLR, mobile services switching centres (mobile exchanges) MSC and base station controllers BSC connected to the base stations BTS of the network. Each base station controller BSC and the base stations BTS associated with it form a base station system BSS. The location area data of a mobile station MS are stored in visitor location registers VLR, of which there is typically one per each mobile exchange, whereas the HLR knows which

VLR area the subscriber is visiting. As distinct from the centralized database structure described above, a cellular radio system may also have a decentralized database structure. The network shown in Figure 1 can be regarded as the network of one operator, covering, for example, one country or part of it. The same country may have several overlapping networks for different operators. Such a network of one operator can be connected to corresponding networks of other operators either in the same country or in other countries, or to other data transmission systems, such as a public switched telephone network PSTN, through a specific gateway mobile services switching centre GMSC. Thus it is possible to achieve a mobile telephone system which covers the whole Europe and in which a subscriber who has made a contract with one operator can use a mobile station, in addition to his home network, in the network of any other operator. A subscriber may be fixedly associated with a certain mobile station, as e.g. in the NMT, or he may freely register in any subscriber station, as e.g. in the GSM, by means of a subscriber identification module SIM. A Finnish subscriber may thus go to England and use the services provided by the system from there. Correspondingly, he can always be reached by e.g. another Finnish subscriber who tries to call him, presuming that he is still in Finland. The system simply routes the call from Finland in a suitable manner, e.g. through the networks of Sweden and Norway, to the current location of the other subscriber in England. In this case, the A-subscriber does not necessarily ever find out that he made a call to England.

It is, however, obvious that the charge of a call is of a quite different level if the subscriber makes a call from or receives a call in England instead

of his Finnish home network. In addition, the network of one operator may contain various tariff areas. In other words, the charge of a single call depends on the relative location of the A- and B-subscribers. However, neither of them knows the location of the other one in advance and therefore cannot estimate the charge of the call beforehand. The charge of a call can be divided between A- and B-subscribers in many ways. According to the current practice, the A-subscriber pays the charge of a call as far as it is due to the routing of the call from the A-subscriber to the home network of the B-subscriber, whereas the B-subscriber pays the extra charge due to his roaming away from his home network. Alternatively, the entire charge of a call can be collected either from the A- or the B-subscriber.

The present invention gives a subscriber better chances of influencing the charge of a call in advance. According to the invention, this is achieved by informing the subscriber of the charge of a call in advance, before the link to the other subscriber is established, i.e. before any charges are incurred. On the basis of the call charge information, the subscriber can either accept or reject the call. In principle, the charge estimate given to the subscriber may be based on either a real-time call charge information, e.g. the unit charge in the case of charging by time (e.g. dollars/min) or relatively rough distinction between tariff levels.

As the operators seek to have more and more versatile and flexible tariff structures, it may in the long run become difficult to determine in real time what the charge of a call will be. This is because many factors in addition to the dialled number may have an effect on the charge of a call, e.g. the time of the day, or whether the B-subscriber belongs to the user

group of the A-subscriber. Such factors can be taken into account only afterwards, during the postprocessing of charge data. For this reason, the network operators do not perhaps want to offer accurate call-specific indication of charge.

Instead, the operators may offer various tariff levels depending on from where the call is made. A residential contract might offer cheap calls in the home zone but expensive calls elsewhere. The problem is that the user of a mobile station should know, while waiting for a call to be set up, on the basis of which tariff he will be charged. He would at least like to be warned if the charge of the call to be set up is based on a tariff higher than the cheap basic service of the subscriber because the subscriber has roamed outside his home network/zone. The subscriber does not necessarily need to know the exact charge per minute but only whether the low or high tariff will be applied. Such rougher tariff information is easier to determine in real time, and it is thus very advantageous to use as the present charge information, given to a subscriber for consideration before the setting up of the call is continued. If necessary, there may be more than two tariff/charge levels.

The function according to the invention has several embodiments. In one embodiment, the fixed network interrupts the call set-up and transmits information on the charge or the charge level to the mobile station MS that will be charged, in connection with each call without any criteria if the extra function according to the invention is activated. In the preferred embodiment of the invention, the call set-up is interrupted and charge information is sent to the mobile station for the subscriber to accept it only when certain criteria are met. For example, when the charge

is estimated on the basis of tariff levels (e.g. a low tariff area and a high tariff area), it is possible to use e.g. the following types of criteria in a fixed network for estimating tariff information in connection with call set-up:

(a) only the location data of the A-subscriber is decisive, or

(b) the location data of both the A- and the B-subscriber are decisive.

Criterion (a) can be applied, for instance, as follows:

(a1) if the A-subscriber is in his home network, low tariff area charging is applied, or

(a2) if the A-subscriber is outside his home network, low tariff area charging is not applied.

Criterion (b) can be applied, for instance, as follows:

(b1) if the A-subscriber is in his home network and the B-subscriber is within the area of the same network, low tariff area charging is applied, or

(b2) if the A-subscriber is in his home network but the B-subscriber is within the area of a different network, low tariff area charging is not applied, or

(b3) if the A-subscriber has roamed outside his home network but the B-subscriber is within the area of the same network, low tariff area charging is applied, or

(b4) if the A-subscriber has roamed outside his home network and the B-subscriber is, moreover, within the area of a different network than the A-subscriber, low tariff area charging is not applied.

The following is an example with reference to Figure 2 of how the advice-of-charge service and the control of call establishment may be implemented on the basis of different tariff levels in various ways depend-

ing on how the criteria (a) and (b) are applied. The above phrase that the A- and B-subscribers are within the same network can be taken to mean that the A-subscriber MS_A is located within the area of the same exchange MSC, visitor location register VLR or home location register as the B-subscriber MS_B.

Example 1: The A-subscriber MS_A makes a call to the B-subscriber MS_B when the advice-of-charge service according to the invention is activated and criterion (a) is applied, i.e. only the location data of the A-subscriber is decisive. The B-subscriber is within the area of the same exchange MSC1 as the A-subscriber. In this case, the following steps are taken: The MSC1 receives a call set-up request 1 from the A-subscriber MS_A. The MSC1 sends a request 2 concerning the subscriber parameters to the local visitor location register VLR1. According to the subscriber data stored in the VLR1, the A-subscriber MS_A has activated the advice-of-charge service. The VLR1 sends to the MSC1 a response 3, which includes information on the activated advice-of-charge service. Thereafter, the MSC checks at the beginning of the call, using criterion (a) according to the invention, whether the A-subscriber MS_A is within his home network and thus within the low tariff area or not. The A-subscriber is outside his home network and thus not within the low tariff area, and therefore a charge information message 4 and an estimate of the charge of the call are sent to the A-subscriber. If the subscriber accepts the call and sends an acknowledgement message 5, the MSC1 continues to set up the call in the normal manner. If the A-subscriber does not accept the call and does not send an acknowledgement message or sends a negative acknowledgement message, the call set-up is permanently terminated.

Example 2: The A-subscriber MS_A makes a call to the B-subscriber MSB when the advice-of-charge service according to the invention is activated and criterion (b) is applied, i.e. the location data of both the A-and the B-subscriber are decisive. With reference to Figure 3, the following steps are then taken:

The MSC1 receives a call set-up request 1 selected by the A-subscriber. The MSC1 sends a request 2 concerning the subscriber parameters of the A-subscriber to the local visitor location register VLR1. According to the subscriber data stored in the VLR1, the advice-of-charge service is activated. The VLR1 sends to the MSC1 and a response 3, which also comprises information on the activated advice-of-charge service. Thereafter the MSC1 sends a routing request message 4 to the home location register HLR of the B-subscriber. The HLR knows the current visitor location register VLR2 of the B-subscriber. The HLR sends a roaming number request message to the VLR2, which sends the roaming number in its response 6.

The HLR sends to the MSC1 a message 7 comprising the roaming number and the identifier of the current visitor location register VLR2 of the B-subscriber. As the advice-of-charge service has been activated for the A-subscriber, the MSC1 checks whether the call will be a low or a high tariff call. This can be determined, for example, by comparing the current address (VLR1, MSC1) of the A-subscriber with the B-subscriber's roaming number (VLR2), obtained from the HLR. If the tariff class cannot be determined on the basis of these data, the HLR, according to another embodiment of the invention, transmits data relating to the tariff classification of the B-subscriber in a message 7. The MSC1 can use this data for determining the tariff class of the call. If both the A- and the B-

subscriber are within the same network and thus within the so-called low tariff area, the MSC1 does not interrupt the call set-up and does not send a charge information message to the A-subscriber MS_A. In other words, the call set-up is continued in the same way as in a conventional system.

If the A-subscriber has roamed to a network other than his home network, the location of the B-subscriber is decisive. If the B-subscriber is within the area of the same network as the A-subscriber, even if the A-subscriber is not in his home network, the call will be set up within the so-called low tariff area, wherefore the MSC1 does not interrupt the call set-up or send an advice-of-charge message to the A-subscriber. In other words, the call set-up is continued in the normal manner.

If the A-subscriber is not within his home network and the B-subscriber is not within the area of the same network, the call is classified as a high tariff call, wherefore the MSC1 sends an advice-of-charge message 8 to the A-subscriber MS_A, and the mobile station indicates this to the user. If the user accepts the call, he sends an acknowledgement message 9 to the exchange MSC1, whereafter the MSC1 begins again to set up the call in the normal manner. If the A-subscriber does not accept the call on account of its high charge, he does not send an acknowledgement 9 or sends a negative acknowledgement, whereafter the MSC1 permanently terminates the call set-up.

The systems, such as FPLMTS or UMTS, which will follow the current digital cellular networks, will perhaps make the best use of the properties of the invention.

A difference between these systems and the existing ones will be that the paging principles will,

in addition to the public network, also cover domestic and business premises (DCPN and BCPN = Domestic and Business Customer Premises Network) and mobile means of transport (Mobile PBX, or MCPN = Mobile Customer Premises Network). Another difference will be that the UMTS makes a clearer distinction between control relating to a call (Call Control Signalling) and control relating to the actual network connection (Bearer Control Signalling). The UMTS may also have a more specific tariff classification than the current systems owing to the various operation environments, such as home and business premises and mobile means of transport: trains, underground trains, ships, etc.

The present invention requires only minor amendments to a mobile station which may otherwise be a conventional mobile station suitable for the system concerned. In the GSM system, for instance, the mobile station MS may be e.g. the GSM hand-held mobile phone Model 1011, manufactured by Nokia Mobile Phones. Figure 4 is a schematic front view of such a hand-held mobile phone. The phone 21 comprises an alphanumeric LCD display 22, an antenna 24, number keys 25, function keys 26, a hang-off key 27 and a hang-on key 28. A call is started by pressing key 27 and dialling the desired telephone number by means of the number keys 25. If the fixed network sends a charge estimate as a response to the mobile station 21, the mobile station can, for example, give a sound signal by a loudspeaker 29 and simultaneously show the charge estimate, charge level or tariff class on the alphanumeric display 22, as illustrated in Figure 2 by the text "high tariff" on line 23 of the display. If the user accepts the tariff class and wishes to continue the call, he presses again the hang-off key 27, whereby the mobile station 21 sends an acknowledgement message to the fixed network. If the

user considers the call too expensive, he presses the hang-on key 28, whereby the mobile station 21 sends a negative acknowledgement message or no message to the fixed network, which then permanently terminates the call set-up. Instead of an alphanumeric display, the charge level can be indicated, for example, by switching on a LED assigned for this purpose or in some other suitable way.

The figures and the associated description are intended merely to illustrate the present invention. In its details the method according to the invention can vary within the scope of the appended claims.

Claims

1. A method for indicating the charge of a call, c h a r a c t e r i z e d in that

a calling subscriber sends to a fixed network a call set-up request comprising the number of a called subscriber,

the fixed network estimates the charge or charge level of the call to be set up in advance on the basis of the location of the calling subscriber and/or the called subscriber,

the fixed network sends information on the estimated charge or charge level of the call to the subscriber who will be charged for the call, at least in the case that the estimated charge or charge level does not fall within the predetermined range of charges allowable to said subscriber,

the charge or charge level of the call is indicated to the subscriber, and an acknowledgement message is sent to the fixed network if the subscriber wishes to continue with the call set-up,

the fixed network continues with the call set-up after having received said acknowledgement message or otherwise permanently terminates the call set-up.

2. A method according to claim 1, c h a r a c - t e r i z e d in that information on the charge or charge level is sent to the subscriber to be charged in connection with each call.

3. A method according to claim 1, c h a r a c - t e r i z e d in that

the fixed network checks from the subscriber databases the predetermined range of charges allowable to the subscriber to be charged and estimates in advance the charge of the call to be set up,

the fixed network continues with the call set-up in the normal manner if the estimated charge of the call falls within said allowable range of charges,

the fixed network interrupts the call set-up and sends a charge information message to the subscriber to be charged if the charge does not fall within said allowable range of charges.

4. A method according to claim 1 or 3, c h a r a c t e r i z e d in that

the fixed network checks from the subscriber databases the predetermined lowest tariff area of the subscriber, e.g. the home exchange area or the home network of the subscriber,

the fixed network continues with the call set-up in the normal manner if the calling subscriber is located within said lowest tariff area,

the fixed network interrupts the call set-up and sends a charge information message to the calling subscriber if the calling subscriber is not located within said lowest tariff area.

5. A method according to claim 1 or 3, c h a r a c t e r i z e d in that

the fixed network checks from the subscriber databases the predetermined lowest tariff area of the subscriber, e.g. the home exchange area or the home network of the subscriber, and the location of the called subscriber,

the fixed network continues with the call set-up in the normal manner if the calling subscriber is located within said lowest tariff area or if the called subscriber is located within the same tariff area as the calling subscriber,

the fixed network interrupts the call set-up and sends a charge information message to the calling subscriber if the calling subscriber is not located

within said lowest tariff area or if the called subscriber is not located within the same tariff area as the calling subscriber.

6. A method according to claim 1 or 3, c h a r a c t e r i z e d in that

the fixed network checks from the subscriber databases the predetermined lowest tariff area of the subscriber, e.g. the home exchange area or the home network of the subscriber,

the fixed network continues with the call set-up in the normal manner if the called subscriber is located within said lowest tariff area,

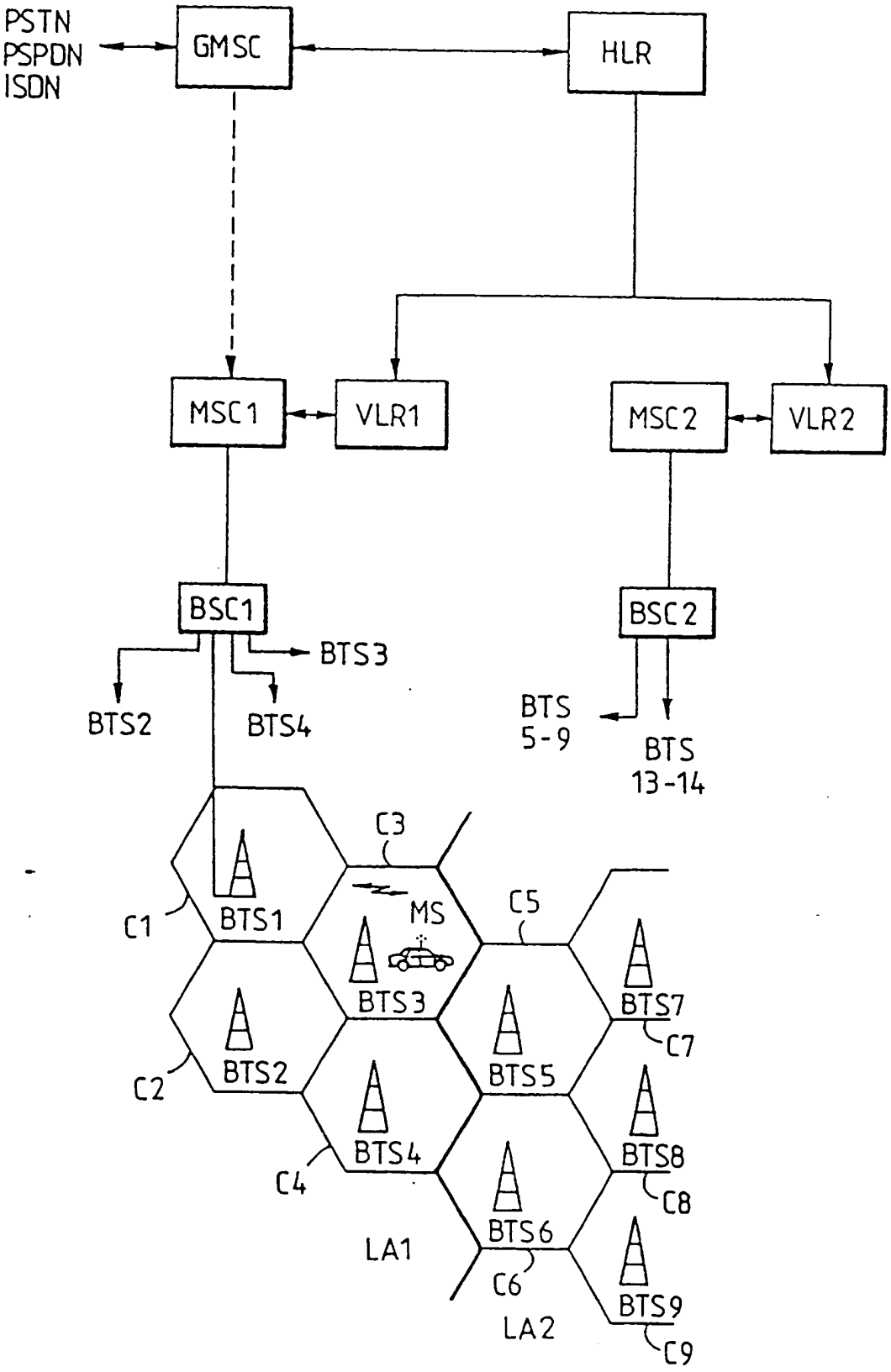
the fixed network interrupts the call set-up and sends a charge information message to the called subscriber if the called subscriber is not located within said lowest tariff area.

7. A method according to claim 1 or 3, c h a r a c t e r i z e d in that

the fixed network checks from the subscriber databases the predetermined lowest tariff area of the subscriber, e.g. the home exchange area or the home network of the subscriber, and the location of the calling subscriber,

the fixed network continues with the call set-up in the normal manner if the called subscriber is located within said lowest tariff area or if the calling subscriber is located within the same tariff area as the called subscriber,

the fixed network interrupts the call set-up and sends a charge information message to the called subscriber if the called subscriber is not located within said lowest tariff area or if the called subscriber is not located within the same tariff area as the calling subscriber.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C3
C1
BTS1
MS
C5
BTS3
BTS7
C7
BTS2
BTS5
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BTS4
BTS8
C4
C8
BTS6
LA1
C6
BTS9
LA2
C9

FIG. 1

8. A method according to any one of the preceding claims, c h a r a c t e r i z e d in that a blocking function is activated in the subscriber data of the subscriber, whereafter the fixed network does not continue with the call set-up even if it receives an acknowledgement message from the subscriber if the estimated charge or the charge level of the call does not fall within the range of charges set for the subscriber by the blocking function.

9. A subscriber station comprising a display, number keys and function keys, c h a r a c t e r i z e d in that the subscriber station indicates the call charge information received from the telecommunications network on a display, and that a user may activate the subscriber station by said function keys to send an acknowledgement message to the telecommunications network in order to continue the setting up of the call.

10. A subscriber station according to claim 9, c h a r a c t e r i z e d in that the subscriber station is a mobile station.

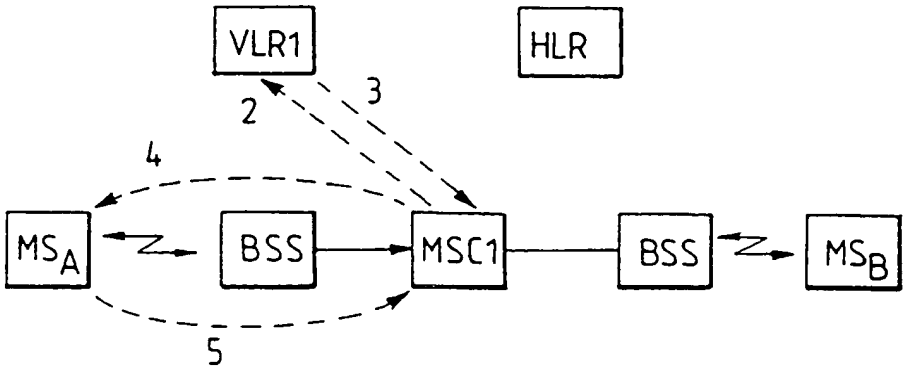

FIG. 2

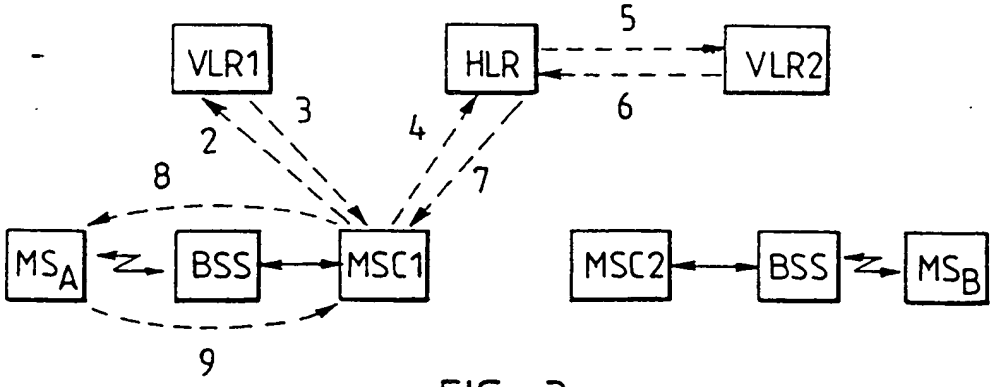

FIG. 3

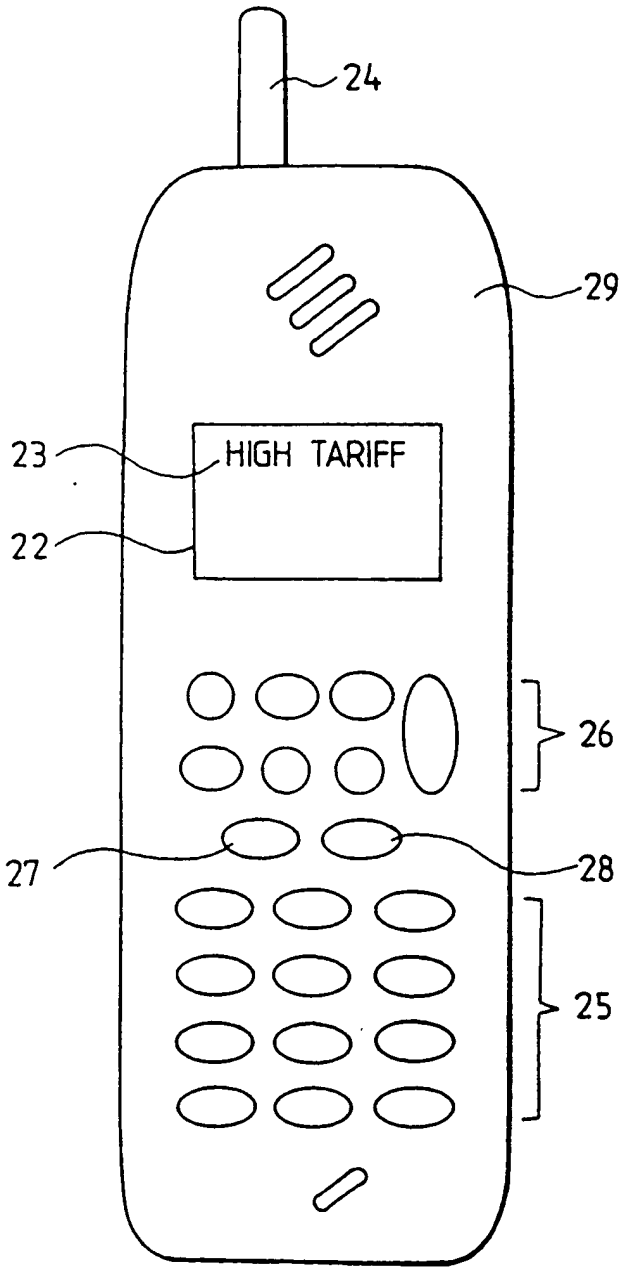

FIG. 4

A. CLASSIFICATION OF SUBJECT MATTER

IPC [5] : H04M 15/16, H04M 3/38
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC [5] : H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE, A1, 3305978 (SIEMENS AG), 23 August 1984 (23.08.84), page 3, line 5 - line 22; page 4, line 16 - line 24, claim 10	1-2,9
Y	--	3-8,10
Y	US, A, 5109401 (KIYOSHI HATTORI ET AL), 28 April 1992 (28.04.92), column 1, line 24 - column 2, line 48	3-8,10
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Y	DE, B2, 2830181 (SIEMENS AG), 24 January 1980 (24.01.80), claims 1-3	3-8
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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 Sept 1994	29 -09- 1994
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Per Lindberg Telephone No. +46 8 782 25 00

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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		JP-A- 3128563	31/05/91
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		JP-T- 1502871	28/09/89
		WO-A- 8807797	06/10/88
US-A- 4879742	07/11/89	JP-A- 1042954	15/02/89